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ARTICLE IV.

On the Longitude of the Hall of the American Philosophical Society, deduced from an Occultation of Aldebaran observed by S. C. Walker January 5th 1830. Read before the American Philosophical Society October 18th 1833.

ON the evening of January 5th 1830, I observed the occultation of Aldebaran at the place mentioned in the Memoir on the Solar Eclipse of February 12th 1831, in the fourth volume of the Transactions of the American Philosophical Society. The local time was estimated from observations of the sun on the meridian, by Joseph Roberts, Jun. at the Friends' Observatory. The telescope used was by Dollond, three and a half feet achromatic. The immersion and emersion were both visible. The same phenomena were observed by Mr Maclear at Biggleswade, England; by Mr Paine at Boston; and Mr Bond at Dorchester, Massachusetts. The immersion was observed at Cambridge, England, by Professor Airy; and at Bedford, England, by Captain Smyth. The observations were as follows:

Occultation of α Tauri, January 5th P.M. 1830.

| Immersion. | Emersion. | Observer. | Place of Observation. | Latitude North. | Longitude from Greenwich. |
|-----------------|----------------|-----------|-----------------------|-----------------|---------------------------|
| H. M. S. | H. M. S. | | | ° ' " | H. M. S. |
| 9 56 15.00 m.* | 11 44 30.00 m. | Walker. | Philadelphia. | 39 57 01.0 | 5 00 43.4 west. |
| 10 14 50.50 m. | 11 12 19.00 m. | Paine. | Boston. | 42 20 38.0 | 4 44 15.2 west. |
| 10 14 51.00 m. | 11 12 50.00 m. | Bond. | Dorchester. | 42 19 20.0 | 4 44 17.0 west. |
| 10 41 53.18 s.† | | Smyth. | Bedford, Eng. | 52 08 27.6 | 1 51.97 west. |
| 10 42 44.70 s. | 11 33 19.60 s. | Maclear. | Biggleswade, Eng. | 52 5 25.0 | 1 3.50 west. |
| 10 44 07.44 s. | | Airy. | Cambridge, Eng. | 52 12 10.0 | 23 54.00 east. |

* The letter m denotes mean solar time.

† The letter s denotes sidereal time.

This occultation is valuable for the purpose of determining the longitude of Philadelphia, Boston, and Dorchester, from the circumstances of its having been very carefully observed at several established observatories in England. It was selected by Mr Henderson for determining the longitude of Biggleswade and Bedford, and gave the following results.

| | By α Tauri, Jan. 5 1830. | By all the Observations to 1832. |
|---------------------------------|---------------------------------|----------------------------------|
| | M. S. | M. S. |
| Biggleswade, west of Greenwich. | 1 02.70 | 1 03.50 |
| Bedford, west of Greenwich. | 1 50.60 | 1 51.97 |
| Bedford, west of Biggleswade. | 47.30 | 48.47 |

The near agreement of the longitudes deduced from this occultation with the mean of many others, induced me to calculate the longitude of the Hall of the American Philosophical Society from my observations, allowance being made for the place where the observations for local time were made, and for the place where the occultation was observed. The longitude of this Hall, thus deduced, is west from Greenwich, 5 h. 0 m. 46.09 sec.

This longitude exceeds by a few seconds that determined by Rittenhouse from the transit of Venus. It agrees more nearly with the estimates of De Ferrer and Bowditch, and with the recent determination of R. T. Paine from Joseph Roberts' and my observations of the solar eclipse of 1831.

The parallaxes in declination and right ascension were calculated by the method of Maclear, Mem. Ast. Soc. London, Vol. IV., No. XXIX. By this method the errors of the tables of the moon's right ascension are deduced from the star's right ascension, and the moon's tabular declination, independently of the tabular right ascension of the moon.

The longitudes deduced from this occultation by Maclear's method, confirm the remark of Captain Smyth, Ast. Soc. Mem., Vol. IV. p. 567; the west longitude deduced from the immersion being too great, and that from the emersion too small. The mean of the results is however generally accurate.